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We claim:

1. An isolated nucleic acid sequence which codes for a polypeptide having $\Delta 6$ -acetylenase and/or $\Delta 6$ -desaturase activity, selected from the group:
 - a) of a nucleic acid sequence having the sequence depicted in SEQ ID NO: 1, SEQ ID NO: 3 or SEQ ID NO: 11,
 - b) nucleic acid sequences which, as a result of the degeneracy of the genetic code, are derived from the nucleic acid sequence depicted in SEQ ID NO: 1, SEQ ID NO: 3 or SEQ ID NO: 11,
 - c) derivatives of the nucleic acid sequence depicted in SEQ ID NO: 1, SEQ ID NO: 3 or SEQ ID NO: 11, which code for a polypeptide having the amino acid sequences depicted in SEQ ID NO: 2, SEQ ID NO: 4 or SEQ ID NO: 12, and having at least 75% homology at the amino acid level with a negligible reduction in the enzymatic action of the polypeptides.
2. An amino acid sequence encoded by a nucleic acid sequence as claimed in claim 1.
3. An amino acid sequence as claimed in claim 2, encoded by the sequence depicted in SEQ ID NO: 1, SEQ ID NO: 3 or SEQ ID NO: 11.
4. An expression cassette comprising a nucleic acid sequence as claimed in claim 1, where the nucleic acid sequence is linked to one or more regulatory signals.
5. A vector comprising a nucleic acid sequence as claimed in claim 1 or an expression cassette as claimed in claim 4.
6. A transgenic organism comprising at least one nucleic acid sequence as claimed in claim 1 or at least one expression cassette as claimed in claim 4 or at least one vector as claimed in claim 5.
7. A transgenic organism as claimed in claim 6, where the organism is a plant, a microorganism or an animal.

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8. A transgenic plant comprising a functional or nonfunctional nucleic acid sequence as claimed in claim 1 or a functional or nonfunctional expression cassette as claimed in claim 4.
- 5 9. A process for preparing unsaturated fatty acids, which comprises introducing at least one nucleic acid sequence as claimed in claim 1 or at least one expression cassette as claimed in claim 4 into an oil-producing organism, culturing this organism and isolating the oil contained in the
- 10 organism, and liberating the fatty acids contained in the oil.
10. A process for preparing triglycerides with an increased content of unsaturated fatty acids, which comprises
- 15 introducing at least one nucleic acid sequence as claimed in claim 1 or at least one expression cassette as claimed in claim 4 into an oil-producing organism, culturing this organism and isolating the oil contained in the organism.
- 20 11. A process as claimed in claim 9 or 10, wherein the unsaturated fatty acids have an increased content of unsaturated fatty acids with a triple bond or with a double bond in position 6 or a triple bond and double bond in position 6.
- 25 12. A process as claimed in any of claims 9 to 11, wherein the organism is a plant or a microorganism.
13. A protein comprising the amino acid sequence depicted in
- 30 SEQ ID NO: 8.
14. A protein comprising the amino acid sequence depicted in SEQ ID NO: 10.
- 35 15. The use of ~~proteins~~ as claimed in claim 13 or 14 for preparing ~~unsaturated~~ fatty acids.
- 40 16. A process for preparing triglycerides with an increased content of unsaturated fatty acids by incubating triglycerides with saturated or unsaturated or saturated and unsaturated fatty acids with at least one of the proteins as claimed in claim 2, 13 or 14.
- 45 17. A process as claimed in claim 16, wherein the triglycerides are prepared in the presence of a compound which is able to take up or release reducing equivalents.

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18. A process as claimed in claim 16 or 17, wherein the fatty acids are liberated from the triglycerides.
- 5 19. An unsaturated fatty acid prepared by a process as claimed in claim 9 or 18.
20. A triglyceride with an increased content of unsaturated fatty acids prepared by a process as claimed in claim 10, 16 or 17.
- 10 21. The use of a nucleic acid sequence as claimed in claim 1 or an expression cassette as claimed in claim 4 for producing transgenic plants.
- 15 22. The use of a nucleic acid sequence as claimed in claim 1 or of a fragment thereof for isolating a genomic sequence by homology screening. *miss scope*
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- 20 23. The use of unsaturated fatty acids as claimed in claim 19 or triglycerides with an increased content of unsaturated fatty acids as claimed in claim 20 for producing human foods, animal feed, cosmetics or pharmaceuticals.

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